

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings of claims in the application. The following listing provides the amended claims with deleted material crossed out and new material underlined to show the changes made.

1. (Currently Amended) A method of scaling a bit budget for encoding a digital video picture, said method comprising:

receiving a value identifying a particular relaxation level from a plurality of relaxation values levels, each relaxation level identifying a different scaling relationship from a plurality of scaling relationships, each scaling relationship specifying a particular relationship for scaling the bit budget in relation to usage of a decoder buffer;

from the plurality of scaling relationships, selecting [[the]] a scaling relationship that corresponds to the particular relaxation level identified by the received value;

based on the decoder buffer usage and the selected scaling relationship, scaling the bit budget; and

at a rate controller, encoding said digital video picture by using the scaled bit budget.

2-14. (Canceled)

15. (Previously Presented) A method of encoding a sequence of video frames, the method comprising:

allocating an initial value for a bit budget for a current frame in the sequence of video frames;

receiving a relaxation control value specifying a particular scaling relationship from a plurality of scaling relationships for scaling the bit budget in relation to a percentage of

memory buffer space used, the scaling performed in order to prevent an underflow or an overflow of the memory buffer;

determining a scale value for scaling the bit budget based on the percentage of memory buffer space used and the particular scaling relationship;

determining a final bit budget for the current frame based on the scale value; and
at a rate controller, encoding the current video frame using the final bit budget.

16. (Previously Presented) The method of claim 15, wherein the received relaxation control value is in a range from 0 to 1, wherein the determined scale value is in a range from 0 to 1.

17-19. (Canceled)

20. (Currently Amended) The method of claim 15, wherein determining the final bit budget for the current frame comprises multiplying the initial value for the bit budget by the scale value.

21. (Canceled)

22. (Previously Presented) The method of claim 1, wherein a larger relaxation level results in a smaller scaling of the bit budget for the digital video picture.

23. (Previously Presented) The method of claim 1, wherein the bit budget is not scaled when the decoder buffer does not deviate from a target path.

24. (Currently Amended) The method of claim 1, wherein a relaxation level of 0 results in maximal scaling of the bit budget with respect to the decoder buffer usage and a relaxation level of 1 results in no scaling of the bit budget regardless of the decoder buffer usage.

25. (Previously Presented) The method of claim 1, wherein the plurality of scaling relationships includes a base scaling relationship when the value identifying the particular

relaxation level is 0, wherein the other scaling relationships are derived by using the base scaling relationship and the value identifying the particular relaxation level.

26. (Previously Presented) The method of claim 1, wherein each of the plurality of different scaling relationships maps a plurality of buffer anxiety levels quantifying buffer underflow or overflow to a plurality of scaling values for scaling the bit budget.

27. (Currently Amended) The method of claim 1, wherein a first value identifying a first relaxation level results in selection of a first scaling relationship between the decoder buffer usage and the scaling of the bit budget and a second value identifying a second relaxation level results in selection of a second scaling relationship between the decoder buffer usage and the scaling of the bit budget, wherein the first value results in a greater effect on the scaling of the bit budget with respect to the decoder buffer usage as compared to the second value, wherein the first relaxation level corresponds to a greater concern regarding optimal use of the decoder buffer.

28-34. (Canceled)

35. (Previously Presented) A non-transitory computer-readable medium storing a computer program which when executed by a processor encodes a sequence of video frames, the computer program comprising sets of instructions for:

allocating an initial value for a bit budget for a current frame in the sequence of video frames;

receiving a relaxation control value specifying a particular scaling relationship from a plurality of scaling relationships for scaling the bit budget in relation to a percentage of memory buffer space used, the scaling performed in order to prevent an underflow or an overflow of the memory buffer;

determining a scale value for scaling the bit budget based on the percentage of memory buffer space used and the particular scaling relationship;

determining a final bit budget for the current frame based on the scale value; and at a rate controller, encoding the current video frame using the final bit budget.

36. (Currently Amended) The non-transitory computer-readable medium of claim 35, wherein the scale value is set in a range from 0 to 1, wherein the relaxation control value is set in a range from 0 to 1.

37. (Currently Amended) A non-transitory computer-readable medium storing a computer program which when executed by a processor scales a bit budget for encoding a digital video picture, the computer program comprising sets of instructions for:

receiving a value identifying a particular relaxation level from a plurality of relaxation values levels, each relaxation level identifying a different scaling relationship from a plurality of scaling relationships, each scaling relationship specifying a particular relationship for scaling the bit budget in relation to usage of a decoder buffer;

selecting, from the plurality of scaling relationships, [[the]] a scaling relationship that corresponds to the particular relaxation level identified by the received value;

scaling the bit budget, based on the decoder buffer usage and the selected scaling relationship; and

encoding the digital video picture by using the scaled bit budget.

38. (Previously Presented) The non-transitory computer-readable medium of claim 37, wherein the plurality of scaling relationships includes a base scaling relationship when the value identifying the particular relaxation level is 0, wherein the other scaling relationships are

derived by using the base scaling relationship and the value identifying the particular relaxation level.

39. (Previously Presented) The non-transitory computer-readable medium of claim 37, wherein each of the plurality of different scaling relationships maps a plurality of buffer anxiety levels quantifying buffer underflow or overflow to a plurality of scaling values for scaling the bit budget.

40. (Currently Amended) The non-transitory computer-readable medium of claim 37, wherein a first value identifying a first relaxation level results in selection of a first scaling relationship between the decoder buffer usage and the scaling of the bit budget and a second value identifying a second relaxation level results in selection of a second scaling relationship between the decoder buffer usage and the scaling of the bit budget, wherein the first value results in a greater effect on the scaling of the bit budget with respect to the decoder buffer usage as compared to the second value, wherein the first relaxation level corresponds to a greater concern regarding optimal use of the decoder buffer.